Research Memorandum 76-27

A METHOD FOR DETERMINING COMMON CORE PERSONNEL AND TRAINING REQUIREMENTS

Robert C. Trexler and Hugo F. Braden
Human Resources Research Organization

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INDIVIDUAL TRAINING AND SKILL EVALUATION TECHNICAL AREA

U. S. Army

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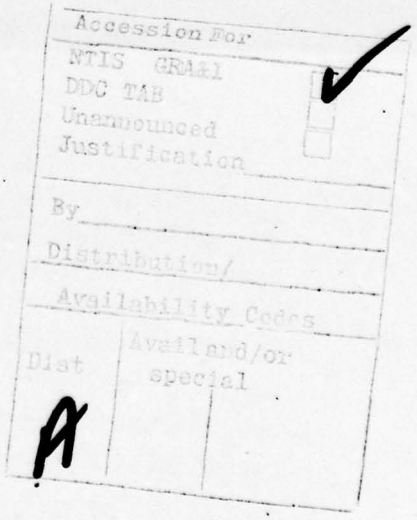

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A METHOD FOR DETERMINING COMMON CORE PERSONNEL AND TRAINING REQUIREMENTS

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A METHOD FOR DETERMINING COMMON CORE PERSONNEL AND TRAINING REQUIREMENTS

PROBLEM

Training waste is a recurring problem that may not be very serious in any given case, but may be quite serious in the aggregate.

There are many kinds of training waste: training time spent in teaching what is not demonstrably required by the job; instruction geared to the "average" student capability, requiring fast learners to slow down and slow learners to struggle; administrative systems that, through inertia, prevent increased efficiency in training all but a few.

OBJECTIVE OF THIS RESEARCH

The problem addressed in Work Unit CALLSIGN was that of developing a method that allowed training program developers to determine training content based on the assumption that hardware aspects of a job will change according to progress made in the state of the art. The specific objective was to develop a method that training managers or planners could use in defining the content or "core" training programs in particular, rather stable job classifications.

There are many military—and civilian—jobs that depend on the incumbents' knowledge of a great number of specifics about particular systems, both software and hardware. As the hardware or software changes, the worker must learn new aspects about the job in order to be able to continue to perform it.

Thus, when the dictating machine became available, the secretary's need for shorthand was minimized. Although there are still situations when a secretary needs to be able to use shorthand, the dictating machine made it possible for the acts of dictation and transcription to be time-separated. The author no longer has to have his secretary physically present; the secretary no longer must wait until the author finishes his thought. The services of dictation/transcription were magnified manyfold. Thus, the technological evolution brought an enlargement of the pool of personnel who were able to perform a similar service. Certain other skills came into play. While the secretary no longer had to learn shorthand, developing a proficiency that would allow her to keep pace with the dictation, she *did* have to learn how to/use the new machine and how to function within the new administrative structure that the machine imposed on the working environment.

When the computer emerged as an accounting tool, previous skills acquired by bookkeepers began to be obsolescent. At first, automatic data processing (ADP) systems merely accepted the manual systems, and proved their worth by performing those manual system functions more quickly and with fewer errors than the manual systems did. In some cases, personnel in entire departments learned new skills in order to keep abreast of the new technology. In other cases, older, experienced employees would not or could not learn the new skills, and they were replaced. Management learned eventually that the ADP systems rarely reduced the personnel subsystem; rather, they changed it radically, and introduced a host of new problems. But these are simple examples of how innovations in methods or machines result in personnel stress manifested by training requirements of one sort of another.

NEED FOR TRAINING IN THE MILITARY

The military services are, of course, involved heavily in training. One reason for the need for training in the services is the turnover of personnel. Until very recently, the draft and the Vietnam War caused about 80% of first-term soldiers to terminate service on expiration of their service period. This immense manpower turbulence required a pipeline training establishment. The turbulence existed in all kinds of MOSs, not just in the combat MOSs. Were it not for turnover, the training requirements would be dictated by the maintenance of job proficiency, by accommodation to changes in tactics, by changes in administrative procedures, or by changes in materiel. It is the last aspect—changes in materiel—that causes particularly vexing training problems in high technology occupations.

Bases for Training Decisions

The military training managers must deal with a number of contentious factors in making training decisions. First, in order to realize the economies that come with mass training, training authorities have established technical training schools where trainees can learn how to operate and maintain specific materiel. The materiel may be a subsystem of a larger system (such as a missile in an air defense missile system) or several whole systems (such as the set of field radios used by infantry organizational elements).

In rare instances, the training authorities might state that the trainee, upon graduation from the school, is fully qualified to perform all the duties required of the MOS. Generally, and with some good reasons, authorities will state that the graduate will be able to perform at an apprentice level, or entry level. Of course, the specifics are spelled out, but until the system engineering of training programs is completed, no assertion for performance assurance can generally be made.

Upon assignment to a unit, the soldier is required to assume certain working responsibilities. His immediate supervisor monitors his performance and hopes he can be used not only in the position for which he received his technical training, but also for sundry other work for which he was not trained.

If there are enough of the hardware systems in the inventory to justify setting up a pipeline training program, then the schools are tasked to organize and conduct the training. It sometimes happens that there are so few equipment systems in existence that it would not pay to set up a special training program to man them. In such cases, the training is arranged to be conducted at the manufacturer's home base, or the training is on the job through the use of company employees to provide "turn-key" training.

On the other hand, there are systems, such as the infantry company communications gear, with such widespread dispersion that a lock-step training program is set up and the pipeline ensures a steady supply of trained personnel.

In the middle ground, with somewhat hazy borders, lie the systems that are too few in number to justify pipeline training, but too many to staff with contractor personnel. Such systems also may be subject to rapid change as technology grows, or as the demands of world-wide geopolitical requirements dictate. It is common in such systems to return experienced personnel to a manufacturer's plant to receive contractor training in the new equipment. The trained soldier then returns to his unit to await the arrival of the new equipment, or, in the event it has already been installed, to operate or maintain it. In some of these rapidly evolving systems the same soldier may return for another course to learn the specifics of yet another related or replacement equipment.

Interferences With Utilization of Trained Personnel

Another factor interferes with economical utilization of trained soldiers. Certain kinds of jobs require security clearances of a particular type. Until approval is received

for a soldier to have access to the areas of installation that are secure, he is prevented from doing the technical tasks he is trained to do. If the soldier has moved about very much prior to his joining the service, he may have to wait a long time for the investigators to complete their security check.

A factor that impacts upon effective utilization of military personnel is their competitive stance vis-a-vis civilian contract, or government civilian employees. In order to ensure continuity of certain kinds of tasks and to make certain that all essential positions are properly staffed at all times, certain critical jobs in certain agencies have become civilianized. This means that the soldier cannot perform the job for which he was trained because that job is being performed by a civilian.

DETERMINING TRAINING TASKS FOR THIS STUDY

To address the problem of determining a set of training tasks that constitute the core or common tasks shared by soldiers employed in jobs utilizing limited-density equipments, we selected the telecommunications field as a vehicle.

The Army's automated telecommunications system has characteristics that qualify it for study. Manned by a mix of civilian and military personnel, this world-wide system handles military record traffic. These records may be logistics files or replenishment requests; they may be troop strength and readiness reports. The records may or may not be encrypted. The means of transmission is variable—teletype, magnetic tape, cards, and so forth. The message may move over hard wire or secure cable; it may be transmitted by tropospheric or satellite radio.

The traffic networks consist of terminals and switches. Personnel at terminals receive messages which can then be transmitted, through one or more switches, to other terminals and thence to their addressees. The presently evolving automated telecommunication system is the latest stage of a process that has brought greater degrees of speed and access as the years have passed. When the manual teletypewriter was replaced by paper tape transmission it was thought to be a great improvement, but now it is virtually obsolete. The speed of transmission has risen to the 9600 Baud rate. Truly, no man could operate a "bug" that fast.

Clearly, machines are speaking to machines. But it is more than that. The machines are even selecting which channels to transmit on by virtue of examining the addressee, the condition of the channel (precedence of message, messages awaiting transmission, etc.), and other aspects of the current situation in the system. As messages move from the originator to the addressee through the communications links, the personnel who man the facilities supervise the process and service the machines.

The problem that the Army faced, and still faces, is the amount and topic of training that should be given to the people who must service these machines and systems. Some experienced personnel will have been taught everything there is to know about all things in order to ensure that all possibilities are covered. Yet that is not an effective solution. Manufacturers will describe all aspects of machine performance to ready listeners who will probably never understand the information nor be required to use it.

APPROACH

JOBGOAL METHOD AS A GUIDE

The method that was used as a starting point in the development of the CALLSIGN method was that developed in Work Unit JOBGOAL.[1]

In JOBGOAL, the method employed to determine the set of tasks that could be used for on-the-job training (OJT) of enlisted personnel was an extension of the survey technique. The situation in JOBGOAL was that the organization that should provide the locus of on-the-job training opportunities was unavailable due to (a) its uniqueness, (b) its remoteness, and (c) its combat criticality. The problem then, was to find a way by which men who were to serve in an overseas organization, (Inventory Control Center, Vietnam ICCV) could learn the essential characteristics of the job they would be performing through OJT in a Continental United States (CONUS) organization performing similar functions.

The problem became one of finding the opportunity in CONUS for personnel to perform the job duties required of a duty position in an organization that did not exist in CONUS. The problem, although studied in the context of Military Occupational Specialty (MOS) 76P40 (Stock Control and Accounting Specialist), is by no means confined to that MOS. Consequently, the procedures developed and employed in JOBGOAL are thought to be applicable to similar situations for other MOSs.

ICCV was unique (although many inventory control centers [ICC] would have to be staffed under world-wide theaters of operations). Located in Vietnam, ICCV was really too far to use as a site for OJT. Moreover, it was performing a combat critical job that ought not to be burdened with OJT responsibilities. The objective of the method in JOBGOAL was to determine a program of OJT that would best represent a match between the job demand of the inventory control center, and the job opportunities of the National Inventory Control Points (NICP), which were the closest feasible training sites for OJT in CONUS.

The method employed consisted of determining statements that described job elements for job positions occupied by 76P40 MOS personnel. The process involved studying published documents, training materials, job descriptions, and so forth, and in interviewing personnel who were assigned duties at Materiel Command installations. These personnel, in cooperation with the Quartermaster School, were able to put together a comprehensive listing of task statements relating to the work performed by 76P40 MOS enlisted personnel. These statements were grouped according to the kinds of duties they related to—for example, data processing, editing, and item management.

A survey of the work actually performed by 76P40 MOS personnel in ICCV permitted a comparison between the opportunity to perform work in CONUS and the need for the work in ICCV. Next, a questionnaire booklet was prepared that inquired as to the frequency of performance of the task element statements. All potential sites for CONUS-based OJT (specifically NICPs) were surveyed. Data from each were analyzed, showing that the opportunity to perform virtually every item included in the survey existed at every site. In JOBGOAL research, it was found that NICPs could serve as

[1] Robert C. Trexler and Patrick J. Butler. *Methods for Identifying On-the-Job Training Content When Surrogate Jobs are Used for Training.* HumRRO Technical Report 73-22, October 1973.

training sites for ICCV-bound 76P40 personnel, in a variety of job settings. A series of three programs was developed to illustrate how an OJT program could be tailored out of the actual data at hand.

OBJECTIVES OF CALLSIGN

In CALLSIGN, the problem was strikingly similar, yet the differences were sufficient to merit undertaking an extension to the approach. Instead of one MOS, there were several. In CALLSIGN, rather than determining what tasks presented opportunity for OJT in one location and actual work in another location, the objective was to determine the degree of commonality among MOSs and equipments so that a common core of training for persons to be assigned duty at automated telecommunications facilities could be established.

With the JOBGOAL problem, the objective was to find a common core of OJT task element statements such that work known to be performed elsewhere could be taught on the job. With the CALLSIGN problem, the objective was to find a common core of task element statements such that work known to be performed on a wide variety of equipment and among several related MOSs could be taught at a location on a single set of equipments, relegating the equipment-specific functions to OJT assignment.

PREPARATION OF QUESTIONNAIRE

We approached the problem by compiling a list of task element statements derived from personnel interview data and from an extensive supply of printed source materials (see Appendix A), which included Army telecommunications pamphlets and manuals, workbooks for Army signal schools, handout materials for MOS courses, AUTODIN operating procedures, Digital Subscriber Terminal Equipment (DSTE) technical manuals, and the manual for the Automated Multimedia Exchange (AMME) facility. The questionnaire booklet, when administered, contained 403 task element statements.

The statements related to all known and supposed duties of personnel in three MOSs: (a) 72B (Communications Center Specialist), (b) 72F (Data Communications Terminal Specialist), and (c) 72G (Data Communications Switching Center Specialist).

The survey covered 20, 30, and 40 level proficiency in MOSs 72B and 72G and 20 and 40 level proficiency in MOS 72F. Thus, the interest was not merely on entry-level performance, but on supervision and management as well.

After tryout at the Pentagon Telecommunications Center (PTC), the questions were modified to try to overcome possible administrative difficulties in a mail survey. The tryout in PTC permitted us to explain any misunderstandings, but this would not be possible when the questionnaire was being administered by mail. Also, in the descriptive portion of the booklet additional questions were framed to address hardware identity, which we did not have during the PTC tryout.

ESTABLISHMENT OF THE SAMPLE

General Plan

The matter of choosing sample size and distribution was a complex one. The telecommunications network has approximately 125 stations around the world. The problem was to send questionnaires to a selection of units that represented a variety of factors (such as geographical locations) that might have a bearing on task performance,

and consequently on training requirements. (From these 125 stations, we ultimately selected 40 units for the survey.)

A factor that clearly had to be taken into account was the quantity of military record traffic processed by a given unit. The Telecommunications Center Survey Status Report (RCS:SCC-PO-36/R1), known as the PO 36 Report, provided a useful picture of this factor: Several stations handled enormous traffic loads, while others were practically silent. Accordingly, we decided that we would need to have some stations in high traffic class, and some in low.

Ultimately, the decision was made to base the selection of units to receive the questionnaires on four factors: (a) the Commands grouped geographically into Europe, CONUS, and Pacific; (b) density of military record traffic handled by the unit; (c) hardware system used; and (d) predicted availability of enlisted personnel at the installation.

Personnel data were obtained from the U.S. Army Communications Command (USACC) that showed the tables of distribution and allowances (TDA) and distribution of personnel throughout the units of interest. It was determined that a proportional coverage of all MOSs would not be feasible. The distribution of MOSs was therefore determined as shown in Table 1 (the procedures followed are described in the following subsections.) A total of 413 questionnaires were sent to USACC for re-transmission to the 40 units.

By the time counting was cut off, 283 questionnaires had been returned, of which 218 were usable.[1] (See Table 2.) The responses from these questionnaires provided the data for the analysis of common core elements.

Table 1

MOS Distribution in Survey

Level of Proficiency	MOS 72B	MOS 72F	MOS 72G	Total
20	45	149	43	237
30	10	--	14	24
40	11	115	26	152
Total	66	264	83	413

Table 2

Distribution of Questionnaire Returns, By Command

Command	Number Returned	Number Usable
Europe	49	32
CONUS	142	108
Pacific	92	78
Total	283	218

[1] With some practice it became possible to detect "copies"—that is, questionnaires that had identical responses from two different individuals. Copies were not considered usable.

Selecting Units for Data Collection

Sampling by Equipment

The locations in which the target population worked had a variety of equipments and configurations. Table 3 lists the various equipments which might be found at a given installation, and which a given soldier might be required to operate or maintain in the course of his assignment. Thirteen distinct equipment types, located at 72 installations, are listed.

Table 3

Equipment Types in Available Units

Equipment Type	Number	Percent of Total
Digital Subscriber Terminal Equipment (DSTE)	54	69
IBM 360-20	8	10
IBM 360-30	1	1
IBM 360-50	1	1
IBM 2780	1	1
UNIVAC 1004	1	1
UNIVAC DCT 9000	2	3
UNIVAC 3301	1	1
UNIVAC 418-II	1	1
CDC 1700	1	1
Overseas AUTODIN	5	6
CONUS AUTODIN	1	1
AMPS	1	1
Total	78	97

From this listing it is clear that the Digital Subscriber Terminal Equipment (DSTE) represented the largest single equipment type in the inventory.

The sampling strategy had to take into account the proportion of equipments that were installed. This selection step was taken in combination with the selection of units by geographical location, described later.

Sampling by Traffic Density

Another consideration that influenced the selections of units for the sample was the traffic load the units handled. Amount of traffic handled was highly related to size of the installation. Generally, the heavier the traffic load, the larger the number of personnel at that installation. It was also observed that the more personnel who were available at an installation, the more specialized an individual's work became. In very small units there was a tendency to cross-train individuals in order to increase their usability on the job. In very large units there was a tendency to train highly proficient technicians in small parts of a whole job. Thus, it seemed important, in selecting sample size, to consider representation by traffic size.

A variable that we did not wish to examine was "communication mode." We therefore selected for further study only those units that were classified as "Operational Mode I."[1] There were 72 of 125 units in the PO 36 Report falling into this category.

Table 4 shows the "Distribution of Units by Traffic Density." The heading "Average Daily Messages" (a commonly used measure of station activity) is the independent variable. It refers to messages processed by a unit on an average daily basis over the period of reporting indicated in the PO 36 Report. The messages handled in any one day would include incoming, outgoing, narrative, tape, and card. For our purposes, this measure seemed to be appropriate since we were looking for a way to examine the influence of traffic density on kinds of tasks performed.

We arbitrarily sorted the stations into density groups of 200 messages. As can be seen in the heading "Number of Units," the largest number of units fell within the 0-199 message density group. Thirty-five percent of the 72 Mode I units from the PO 36 report fell into this group, as the heading "Percent of Total" shows.

Table 4

Distribution of Units, by Traffic Density

Average Daily Messages	Number of Units	Percent of Total	Number Selected in Sample	Percent of Available Units	Percent of Sample
0- 199	25	35	7	28	21
200- 399	13	18	4	31	12
400- 599	8	11	3	38	9
600- 799	4	5	3	75	9
800- 999	5	7	2	40	6
1000-1199	4	5	3	75	9
1200-1399	5	7	3	60	9
1400-1599	0				
1600-1799	1	1	1	100	3
1800-1999	2	3	2	100	6
2000-2199	0		0		
2200-2399	0		0		
2400-2599	1	1	1	100	3
2600-2799	0		0		
2800-2999	0		0		
3000-3199	0		0		
3200-3399	0		0		
3400-3599	1	1	1	100	3
3600-3799	0		0		
3800-3999	0		0		
4000-and up	3	4	3	100	9
Total	72		33	--	100

[1] "Operational Mode I" is a duplex operation with automatic error and channel controls allowing independent, simultaneous, two-way operation.

In order to keep our own data processing efforts in line, we needed to select a sample of the 72 units that would fairly represent each density group listed. We did not need them all. In those cases where there was only one unit, we always selected that one. Since we chose to take all those units which singly represented a group (100% of that group) but less than 100% of those units in which there were more than four units, we skewed the sample automatically toward tasks performed by personnel serving in density groups with a high daily message average. This was an unavoidable compromise that sought adequate coverage without encountering an overwhelming data reduction problem.

In the column showing the number of units selected from each group, it can be seen that seven units were selected from those having a traffic density of less than 200 message units. This number represented 28% of the available population in this group, and 21.2% of the entire sample selected.

When it came to the actual processing of the data, we concluded that the 12 traffic density groups from which samples had been drawn were too many to handle conveniently. We therefore combined the 12 groups as follows: 0-199; 200-799; 800-3599; and 3600 and up. (See Table 5). Data processing therefore would need to deal with four groups rather than 12 on the basis of traffic density, materially reducing the data-processing demand and providing a rational grouping so that inferences could be made.

Table 5

Distribution of Units, by Traffic Density Group

Traffic Density Group	Average Daily Messages	Units in Sample Selected
1	0-199	7
2	200-799	10
3	800-3599	13
4	3600 and up	3

Sampling by Geographical Locations

The units considered for the sample were world-wide in their locations. Since different commands could possibly have different local policies or procedures that might influence the manner in which work was performed, we felt it desirable to ensure that the sample selected included representation of at least three major commands. Table 6 shows the actual distribution of selected units as they existed in the mailout. They were grouped as: Europe 13, CONUS 18, Pacific 7.

The decision to select a unit was based in part on the specific equipment to be found in that unit. Table 7 shows the number of units selected in each of the equipment categories.[1]

Of course, with one-of-a-kind equipments, there could be no choice but to select the unit that contained that equipment. There simply could not be any analysis that took into account geographical effects in which the equipments were different. The DSTE is the critical equipment for the geographical or command structure problem. The AUTODIN switching centers in Europe, CONUS, and Pacific were also selected for the survey.

[1] Source of these data was Telecommunications Center Survey Status Report (RCS:SCC-PO-36 R1).

Table 6

Distribution of Selected Units, By Geographical Location

Command	Number of Units	Percent of Total
Europe	13	34.2
CONUS	15	39.4
Alaska	2	5.2
South	1	2.6
Pacific	7	18.4
Total	38	100

Table 7

Number of Units Selected, By Equipment Type

Equipment Type	Number of Units Selected
DSTE	17
IBM 360-20	7
IBM 360-30	1
IBM 360-50 / UNIVAC 3301	1
IBM 2780	1
UNIVAC 1004 / CDC 1700	1
UNIVAC DCT 9000	4
UNIVAC 418-II	1
Overseas AUTODIN	5
CONUS AUTODIN	1
AMPS	1
Total	40

Selecting Personnel to Participate

Having selected units on the basis of traffic density, geographical location, and equipment type, it was now possible to select the respondents. We could not select particular individuals, of course. However, we could ensure that the questionnaires were sent to the selected units in sufficient quantities and with specific instructions for the questionnaires to be completed by personnel having certain MOSs: 72B, 72F, and 72G.

Size of Sample

We had available to us the manning levels at each of the units under consideration at possible survey sites. Table 8 shows the numbers of assigned personnel by MOS and skill level in the three MOSs of interest at the 40 units selected for the survey.

Table 8

Total Enlisted Population in Selected MOS at Selected Units

MOS	Skill Level			Total	Percent of Whole
	20	30	40		
72B	109	12	24	145	16.6
72F	318	00	236	554	63.6
72G	90	27	54	171	19.6
Total				870	

Previous experience led us to conclude that about 400 questionnaires would be as much as we could handle for data processing and analysis. We therefore decided to round off the percentages in Table 8 and then assign proportionate amounts to the MOSs. The figures were rounded to 15% for 72B, 65% for 72F, and 20% for 72G. Table 9 shows the numbers selected for each MOS using the rounded percentages of 400 questionnaires.

At the same time, we wanted the ratios of the skill levels to be proportional. Table 10 gives the same information as Table 8, but by percentages rather than numbers.

Thus, the final projected total number of personnel to be surveyed worked out to 393, the difference from 400 being attributable to round-off. (See Table 11.)

Table 9

Distribution of Personnel to be Selected, By MOS

MOS	Total	Percent
72B	60	15
72F	260	65
72G	80	20
Total	400	

Table 10

Distribution of Personnel, by Skill Level

MOS	Skill Level (percent)		
	20	30	40
72B	75.1	8.2	16.5
72F	57.5		42.5
72G	48.9	14.6	29.3

Table 11

Projected Planned Sample for Personnel

MOS	Skill Level			Total
	20	30	40	
72B	45	5	10	60
72F	149	00	110	259
72G	39	12	23	74
Total				393

Selecting Respondents

The next step in the process was to specifically allocate the precise number of individuals in each MOS and skill level to be contacted at each of the selected units. Having found the units on the basis of geography, equipment, and traffic density, it remained to determine the number of personnel in each unit of each MOS and skill level. This was done by using TDA data which shows the numbers authorized and assigned of the MOS personnel of interest. Having determined how many were required in each MOS and skill level, we established the sample from the populations supposedly at the stations selected by listing the number assigned to each unit, and then selecting some percentage of that number.

We needed at least one individual in each MOS, if possible, and each skill level. But, since we needed only 12 people with an MOS of 72B30, it was clear we would not be able to select one from each of the 40 units. The 72Gs were found principally at the AUTODIN switching centers and not at tributary stations. The selection process was interactive, and proceeded as follows.

We noted the total number of a given skill level to be selected (e.g., 45 of the 72B20s). With 40 units participating, this would require, on the average, one 72B20 for each unit. However, only 11 units had 72B20s assigned. Accordingly, the number to be selected from each unit was increased to about four. In those units that reported fewer than four 72B20s assigned, we selected the whole set. In larger units, more than four 72B20s had to be selected.

The total selected on the first try was only 21. On the second iteration, additional selections were made to bring the total to 45. The same process was used for the remainder, with the total number of personnel assigned to any given unit always a consideration, with a proportional amount used to determine an initial selection. Table 12 shows the number of personnel in each MOS and skill level ultimately selected for the survey.

ADMINISTRATION OF THE QUESTIONNAIRE

To increase the likelihood of obtaining a response to the questionnaire, we sought and received the cooperation of Headquarters, USACC. A transmittal letter signed by the Deputy Commanding General (Appendix B) requested personnel affiliated with the selected units to cooperate with HumRRO in the study. USACC distributed the questionnaire directly to personnel in the selected units and requested that the completed

Table 12

Number of Personnel Selected for Survey, by MOS and Skill Level

Unit Identification Codes (UIC)[1]		MOS									Total
		72B			72F			72G			
		20	30	40	20		40	20	30	40	
1	0D6		2	1			6	5	1	4	19
2	0D6				6		3				9
3	0PB				3		3	5		2	13
4	0PB	3		1				3	3	3	13
5	0PE				5		1				6
6	0PK				3		3				6
7	0PL				5		5				10
8	0PL						8	4		2	14
9	0PL				3		5				8
10	0PU				5		1				6
11	0P4	1	1	1	3		3	5	3	3	20
12	0SG				5		1				6
13	0SD				5		1				6
14	0S5	2		1	2						5
15	065	7			5		5	3	1	3	24
16	1HH				5		3				8
17	1HJ				5		3				8
18	1HJ				8		3				11
19	1XM	1			3		4				8
20	1XM		1		3		3	5	1	3	16
21	2TG				4		2				6
22	2TG	3	2		9		2				16
23	2TK	3		1							4
24	2TL				5		3				8
25	2T9		1		1		5				7
26	2YX		1		1		5				7
27	3GY	2		1	5		1	8	3	3	23
28	3PB	2		1	3		3				9
29	15A	12		3	4		4				23
30	15A				9		3				12
31	15B				5		2				7
32	15Q	4			3		3				10
33	21K				3		4				7
34	21L				5		1				6
35	21M				3		3				6
36	21N				3		3				6
37	21P				3		3				6
38	24X		1		1		5				7
39	0S6	2	1		4		2				9
40	14P	3		1	4			5	2	3	18
Total		45	10	11	149		115	43	14	26	413

[1] A single unit sometimes has more than one code entry because of differences in equipment or location.

questionnaire be sent directly to HumRRO by a specific date in order to ensure minimum delay.

As indicated earlier, from the 40 organizational elements (Appendix C) to which questionnaires were directed (38 different addressees), questionnaires were received from 283 individuals. A total of 218 questionnaires were usable. The high return rate was undoubtedly due to the Command emphasis placed upon the study.

DATA PROCESSING

Plan for Analysis

While the questionnaires were being answered, we firmed up our data processing plans. In the questionnaire, which had 403 task element statements, each incumbent was asked to indicate the frequency (0, never; 5, more than once an hour) with which he performed each job element. If all 413 questionnaires were returned, there would be 166,439 data elements to be handled (403 X job element statements X 413 questionnaires). In order to determine mean frequency, 413 calculations would be required. In addition, there were other variables of interest, such as geographical effects, that argued in favor of some automatic data processing of raw data.

The data processing method we selected was a frequency distribution program which computed frequencies and percentages for each questionnaire item. The frequency distribution program allowed performance of these computations on a selected subset of questionnaires. We encoded the data so that a variety of computer runs could be made to make the comparisons of interest. The card layout was designed to permit selection of the variables of interest. (See Appendices D and E for codes used and card layout for keypunching data.)

Each questionnaire returned would require seven punched cards to contain the data for one individual. All cards except the first contained only the numeric response to a specific question and an identifier and sequence code. The first card (Appendix E) also contained:

- Unit code. This permitted data from a specific installation to be examined as a subset.
- Identification (ID) number of the individual respondent. All questionnaires were coded sequentially with a unique number as they were received.
- Command. Geographic location: Europe, CONUS, Pacific.
- Duty MOS. Since we were interested in eight unique combinations, a single card column sufficed. We used digit 9 for any other MOS cited as the duty MOS.
- System/Equipment. We allocated three card columns to permit differentiating on the basis of switch/terminal and type of equipment (e.g., DSTE, 360-20.) There are equipments cited in this report that are Government-furnished only (e.g., DSTE). There are other equipments cited in this report that are available commercially which the Government has bought or leased and adapted for its own purposes (e.g., UNIVAC DCT 9000 or IBM 360-20.)
- Size (traffic density). We allowed one card column and four codes to indicate the size of the terminal in average message traffic processed.
- Primary MOS/level. Since personnel are sometimes assigned duties outside of their primary MOS, we believed it desirable to collect and code these data.
- Grade. We allocated one card column to specify the grade of the respondent.
- Months on the job. These data could be used to derive conclusions on turnover.

- Months to become proficient on the job. This is the actual number of months reported by the incumbent.
- Question responses coded as follows:
  0. not performed.
  1. more than 1 or 2 times a year/less than once per month.
  2. more than 1 or 2 times a month/less than once per week.
  3. more than 1 or 2 times a week/less than once a day.
  4. more than 1 or 2 times a day/less than once per hour.
  5. more than 1/hr.
- Equipment data. Card columns 24-34 of the seventh card were used to identify terminal equipment; 36-46 to identify switch equipment; 48-52 to identify optical character equipment; and 54-63 to identify miscellaneous equipment, such as card counters, Telecopiers, COMSEC, etc.

Procedure

When a bundle of questionnaires was received, each was examined to see where the questionnaires came from, how many were in the bundle, and which ones might be unusable (e.g., no entries). Then, each questionnaire was given its unique ID number, and the card layout forms filled out (Appendix E). After a sufficient number of questionnaires had been converted into data on layout sheets, the cards themselves were keypunched and verified. The decks of cards were then held in suspense until all questionnaires had been inputted to the program.

A series of frequency distribution programs was made. Each of the 16 runs made produced frequencies and percentages for questionnaire returns. (See Table 13.)

Table 13

Frequency Distribution Program

Frequency Runs	Number of Questionnaires
DSTE terminal operators, Duty MOS: 72F20	55
Commercial terminal operators, Duty MOS: 72F20	26
DSTE terminal operators, Duty MOS: 72F40	26
Commercial terminal operators, Duty MOS: 72F40	17
Operators of terminals only	152
Operators of switches and associated terminals	37
Operators of small terminals (1-799 messages per day)	82
Operators of large terminals (more than 800 messages per day)	57
Personnel of Duty MOS: 72B	30
Personnel of Duty MOS: 72F	150
Personnel of Duty MOS: 72G	37
Overseas AUTODIN switch operators	15
Commercial switch operators	17
DSTE terminal operators, Duty MOS: 72F20–Europe	22
DSTE terminal operators, Duty MOS: 72F20–CONUS	14
DSTE terminal operators, Duty MOS: 72F20–Pacific	19

In order to show the results of the data analysis more clearly, we developed a diagrammatic display. Figure 1 uses task element statement 11 for a sample diagrammatic display. Each task element statement occupies a position on the ordinate, and the percent of respondents replying is shown on the abscissa. To make comparisons more visible, we grouped responses as follows:

Frequently:	responses from 3,4,5
Seldom:	responses from 1,2
Never:	0

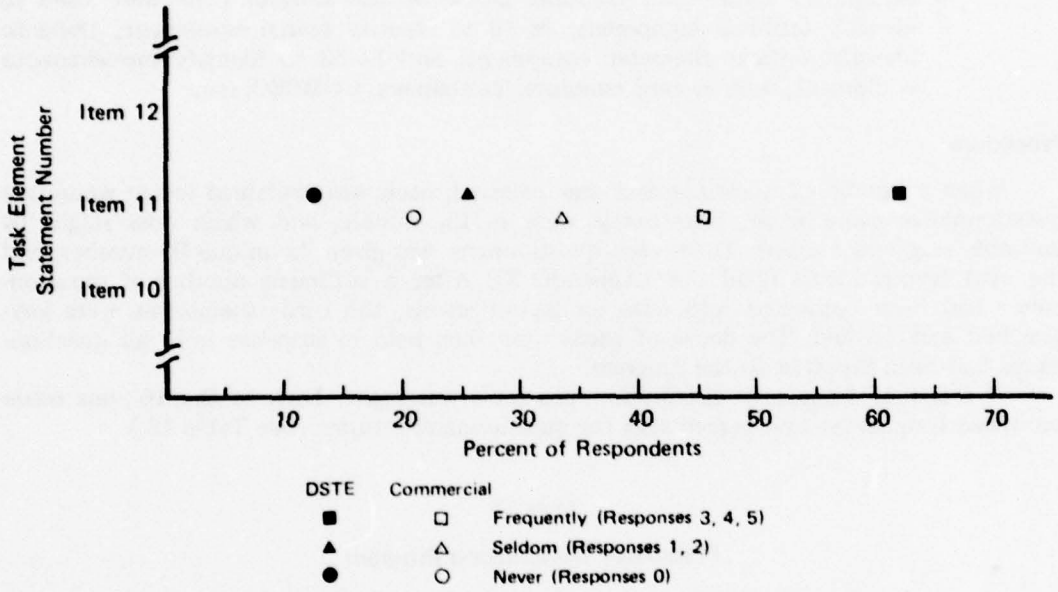

Figure 1. **Sample Diagrammatic Display for Task Elements**

With this display of the data, we were then able to see, for example, that among personnel in MOS 72F20 who worked at DSTE, in comparison to those who worked on commercial terminals, 62% reported they performed job element statement 11 frequently, while 45% of the commercial respondents reported they performed it frequently. Appendix F presents the data for all the task element statements in the form of a percentage comparison between personnel in MOS 72F20 who worked in DSTE and those who worked in commercial terminals.

From the diagrams that were prepared, the following comparisons were made:

DSTE terminal operators, Duty MOS: 72F20 vs.
commercial terminal operators, Duty MOS: 72F20.

DSTE terminal operators, Duty MOS: 72F40 vs.
commercial terminal operators, Duty MOS: 72F40.

Operators of small terminals vs.
operators of large terminals.

Operators of commercial switches vs.
operators of Overseas AUTODIN switches.

Operators of terminals only vs.
operators of switches and associated terminals.

Personnel of Duty MOS: 72B vs.
personnel of Duty MOS: 72F vs.
personnel of Duty MOS: 72G.
DSTE terminal operators, Duty MOS: 72F20 in CONUS vs.
Europe vs.
Pacific.

The diagrammatic displays made it possible to set "levels" and to identify on that basis the job elements performed within levels of frequency. For example, we found that among 72F20s who operate the DSTE terminals, the following job element statement numbers were reported as being performed "frequently" by 60% or more of those reporting: 2, 6, 11, 15, 19, 21, 22, 30, 43, 56, 67, 68, 80, 83, 91, 93, 94, 101, 102, 103, 104, 131, 139, 180, 182, 183, 196, 199, 202, 206, 288, 289, 309, 310, 312, 392.

The list would become shorter if we were to restrict the level to 80%. In general, we examined two levels of performance—40% and 60%. (See Appendix G.) The 40% level included all those in the 60% level.

From these computer runs it was possible, then, to identify certain element statements that incumbents reported performing. If 100% of the respondents reported performing the task frequently, it might reasonably be included as an item for consideration in the development of a training program. Other factors would also impact on that decision, but frequency of performance would be a starting point.

COLLECTION OF COMPARATIVE DATA

These data and analyses allowed us to select sets of task element statements that could be used as a core or common set of training content. Testing the set required administration of the questionnaire to another body of personnel, preferably in the same MOSs and preferably in an advanced telecommunication central.

Such a system was known to be under construction in Oakland, California—an advanced telecommunication facility that could serve as the test base to try out the predictive power of the method.

Arrangements were made to visit this facility, the Automated Multimedia Exchange (AMME), and to administer the questionnaires to as many operating personnel as possible. Eight persons returned completed questionnaires. Because there were so few, we decided to hand score and tabulate the data. The objective now was to determine a method of comparing the results of the AMME survey against the world-wide survey.

When a researcher uses a statistical test in order to be able to accept or reject an hypothesis, he is looking for a way to state that there are differences due to some treatment effect. However, it is usually stated in terms of accepting or rejecting the null hypothesis. Often, p levels are set at .05 for rejecting the null hypothesis. Whenever a chi-square test is used, the null hypothesis would be rejected at the .05 level if the chi-square is equal to or greater than 3.84 with one degree of freedom.

In this study, we were actually trying to establish that the difference did not exist. That is, we would be pleased to find that the responses from AMME were identical to those of the remainder of the population. In such a case we set the p level conservatively at .10 rather than .05. We then performed χ^2 tests to determine whether we could reject the null hypothesis.

In those instances where no differences were found according to the statistical tasks (χ^2), these items are considered, for all practical purposes, to be the set of job element statements that are predicted on the basis of the survey. In the level greater than or equal to 60%, 52 of the 58 job element statements fell into this category. The numbers of the

statements are listed as follows: 1, 3, 4, 5, 8, 9, 12, 14, 16, 17, 18, 20, 25, 26, 28, 29, 32, 33, 39, 40, 41, 42, 49, 51, 54, 62, 63, 72, 73, 74, 81, 90, 92, 100, 105, 179, 185, 186, 188, 189, 191, 198, 201, 208, 337, 338, 339, 340, 341, 342, 390, 391.

In the level greater than or equal to 40%, 39 of 51 job task elements fell into this category. The numbers of the statements are listed as follows (from Appendix G): 6, 11, 13, 15, 19, 21, 22, 23, 24, 38, 43, 50, 56, 61, 68, 80, 83, 91, 93, 94, 101, 102, 103, 104, 130, 140, 166, 180, 182, 183, 187, 199, 209, 288, 289, 291, 388, 392, 393.

FINDINGS

WORLD-WIDE SURVEY

The questionnaire sought data on the frequency of performance of 403 job element statements bearing upon tasks performed in automated telecommunication terminals and switches. Three primary MOSs were involved and three geographical areas were tapped. Respondents from all areas comprised a group of 283. This group represented a 68.5% response to the survey questionnaire.

As a result of the survey, we found or identified 109 of the job element statements (about 27%) to be reportedly performed by 40% or more of the respondents at a frequency that was at least as often as once or twice a week, and might be as often as once an hour. This figure applies to the MOS 72F20 personnel from both DSTE and commercial terminals. Since the largest number of terminals was DSTE, and the largest group of personnel was 72F20s, this set was selected as the "baseline" group. Moreover, DSTE was the only terminal equipment for which Army school training programs were in existence.

So-called "common-core" elements were identified for other groupings as well. The following list shows how many were found for each comparison made:

DSTE 72F20 vs Commercial 72F20	109
DSTE 72F40 vs Commercial 72F40	114
Small Terminal vs Large Terminal	116
Commerical Switch vs AUTODIN	85
Terminal only vs Switch and Terminal	90
72F vs 72G	60
72B vs 72F	63
72G vs 72B	28
72F, 72B, 72G	29
DSTE CONUS 72F20 vs DSTE Europe 72F20	108
DSTE CONUS 72F20 vs DSTE Pacific	102
DSTE Europe 72F20 vs DSTE Pacific 72F20	127
DSTE 72F20, CONUS, Europe, Pacific	98

This list is the number of job element statements that were reported to be performed frequently at the 40% level and above for the groups indicated.

As can be seen from the list, there is a very small common set of job elements among the combined MOSs. The comparison on which to test the predictability of the set was the DSTE 72F20.

TEST OF COMMON SET

The common core set of job element statements was tested against the personnel who worked in the new Automated Multimedia Exchange equipment at Oakland. The specific set of common core job element statements is the set for the MOS 72F20 personnel who were sampled from the DSTEs (world-wide) and the commercial terminals.

This set of 109 job element statements represented the list of job elements that 40% or more of the respondents reported performing "frequently."

If this set of job element statements were to be used as a basis for identifying training content appropriate to the needs of personnel who work in automated telecommunication terminals, we should be able to show that personnel who actually work in such terminals, but who were not part of the original sample, actually do perform the work these job elements predict. In other words, as a test of the validity of the common core set of job element statements, we proposed to use the same questionnaire to determine the extent to which this different population (the AMME personnel) performed the common core job elements. If it could be shown that AMME personnel could not be distinguished from the MOS 72F20 personnel of the world-wide terminal population with respect to the frequency of performance of the job elements in the common core, we could be reasonably sure that the common core set would be useful for at least the foreseeable future.

The objective in our comparison was to determine whether the AMME personnel could be distinguished from the other personnel who established the core set in the first place. We used the χ^2 as the statistical test to apply. The two groups were arranged as follows:

AMMEs, 72F20s: Percent reporting performing the task frequently; percent in the remainder

	% Frequently	% Infrequently
AMME		
72F20		

We selected an alpha of .1 in order to be conservative. We were actually interested in being unable to reject the null hypothesis—to infer that the AMME group could not be differentiated from the MOS 72F20 personnel.

Of the 109 job element statements for the comparison, only 18 were found to have χ^2 that indicated differences significant beyond the .10 level. These statements are listed below in three groups:

Group 1: 27, 36*, 106*, 138*, 141*, 142*
Group 2: 2, 7*, 10, 30, 34*, 35*
Group 3: 67*, 95*, 160*, 197, 206, 310

Items identified with an asterisk (*) are those for which no logical explanation can be found for the difference. However, in Group 1, all these items were reported as being frequently performed by a higher percentage of the respondents in AMME than by 72F20 respondents.

Job element statements 2 and 10 in Group 2 have to do with narrative traffic. The AMME handles proportionately less narrative traffic than would the average DSTE.

Items 197 and 206 in Group 3 have to do with paper tape messages and loading paper in page printers. Again, this might be accounted for by a lower volume of paper printing in AMME as opposed to DSTEs. Item 310 reads "Clean cabinets, tape, card, and paper bins." Since five of the eight AMME respondents were civilians, it may be presumed that the degree of housekeeping would be lower for the AMME.

The following list indicates the topics the job elements occupy in the questionnaire:

Job Element Statement Number	Topic
1-32	General message processing procedure
33-38	Routing
39-45	Format
46	Technical assistance to users
47-50	Reproduction and delivery
51-71	Forms
72-78	Logs
79-81	Distribution
82-105	Service messages
106-159	Computer and common control unit operation
160-179	Errors and machine stops
180-220	Peripheral equipment operation
221-223	Automatic switching center traffic operations
224-253	ASC on-line console operating
254-274	ASC off-line console operating
275-286	Magnetic tape operations
287-292	Teletype operations
293-303	Data network operations
304-307	Equipment outage
308-314	Operator's maintenance
315-332	Maintenance
333-336	Supplies
337-342	Security
343-360	Cryptomaterials
361-383	Supervision
384-387	On-the-job training
388-393	Files
394-397	Administrative functions
398-403	Reports

SUMMATION

SUMMARY OF STUDY

The objective of this project was to develop and try out a method of determining common core content for training programs in the context of automated telecommunications facilities and the operators' world.

The MOSs involved were 72B, 72F, and 72G. Using the 72F as the MOS of principal interest, the results of the survey questionnaire were used to determine the percent of the respondents who reported performing each of 403 job elements frequently, as opposed to performing them infrequently or not at all.

Using a cut-off of 40%, we found that there were 109 job elements that would qualify as being performed frequently by MOS 72F20 personnel who worked in either DSTE or commercial terminals.

If these 109 job elements could represent the "core" of a common training program, then it should be possible to find almost identical responses from a group manning a different terminal facility. The AMME was such a facility and was used as the test bed. The same questionnaire that had been mailed to 413 respondents in the large survey was used in obtaining information on the frequency of performance of the 403 job elements by personnel who worked in the AMME.

Eight questionnaires were returned from the AMME, representing the best, although small, comparison group. Of the 109 items in the common core set, only 18 were found to be reported significantly different by the AMME group as compared to the DSTE and commercial 72F20 groups.

On the basis of this comparison, we may conclude that the common core job element set (reproduced in full in Appendix E) reasonably predicts the duties of personnel who perform operator duties in telecommunication terminals of an automated type. We suggest that these items be considered for inclusion among training topics selected for 72F training.

More significant, perhaps, is the finding that the method of determining what these common core job elements are appears to work reasonably well, and ought to be considered for use in determining what common training is needed in similar situations.

DISCUSSION

The actual list of task element statements, that were shown by this method to be common and predictable, are not the only ones necessary in that set. The number of respondents at AMME was quite small. It would be of interest to re-apply the questionnaire at a later date when we could anticipate a greater number of respondents and the use of AMME has been expanded.

Our conservative statistical approach leads us to reject some items that might reasonably be included. From the standpoint of utility to USACC, one may assert that the USACC staff can be confident in the selection for training of the task elements identified as common. The problem is that there are so few; however, this is due more to the small size of the AMME sample than to any deficiency in the method. In any event, the elements that were identified or confirmed by the AMME study were a subset of the

larger grouping derived from the larger survey. It may be more useful to USACC to accept the larger set than to rely on the certainty of the smaller one.

We have done two things in this study: (a) created a profile on the frequency with which 403 tasks are performed within the communications milieu, and (b) developed a method for selecting among them a unique set that could stand as a common core for the development of common training, independent of the equipment or systems that are in use.

The method developed may be described as follows:

(1) Describe tasks through development of job element statements. Many sources—interviews, technical manuals, operating procedures, lesson plans, the like—can be used to develop sets of job element statements. The elements themselves may be simple or complex; the statements may vary in degree of complexity and responsibility.

(2) Develop questionnaire on frequency of performance. While there are other factors that are important in determining whether a given task requires training, frequency of performance is a principal concern. If the task is seldom performed, perhaps it should not be taught. If the task is frequently performed, perhaps it should be taught, if teaching it formally is cost beneficial. There is a whole set of rubrics to check in selecting training content, and frequency of performance is one variable to consider.

(3) Administer the questionnaire to a representative population. Determining which group is representative may be difficult, as has been the case in this study. But it is possible and necessary.

(4) Select items with X% reported performance frequency for training candidates. One must determine a level for frequency of performance below which the incidence is too small to warrant consideration of the items for inclusion in the common core training. This level is largely a matter of judgment, depending on various circumstances; each item should be examined in the light of other factors that bear upon the cost benefits of training. Whatever administrative decisions are made with regard to selection of levels, the set selected will be the minimum core set to use in setting up a formal training program.

The method would appear to have merit in establishing that set of minimum topics that would constitute the group acceptable for common or core training.

One may ask, "What of the remainder?" The remaining job elements should be relegated to OJT, where the individuals will receive varied cross training. The potential for reduced training costs brought about through the more accurate identification of common training requirements must not be ignored.

APPENDIXES

Appendix A

CALLSIGN QUESTIONNAIRE SOURCES

1. Personnel interview data from Pentagon Telecommunications Center (Washington, D.C.), Hoffman Telecommunications Center (Washington, D.C.), Forrestal Telecommunications Center (Washington, D.C.), East Coast Telecommunications Center (Fort Detrick, Maryland), Automatic Message Processing System (AMPS) (Fort Ritchie, Maryland), Fort Huachuca (Arizona) Telecommunications Center.

2. Department of the Army. *Staffing Guide for U.S. Army Communications Facilities,* Pamphlet 570-567, October 1972.

3. Department of the Army. *Logistics Support Plan, DCS/AUTODIN: Volume I, Automatic Switching Centers; Volume II, Subscriber Terminals,* Pamphlet 750-14.

4. Department of the Army. *Strategic Army Communications Facilities, Data Station Operation,* Technical Manual TM 11-490-4, February 1967.

5. Department of Command Communications, U.S. Army. *Automatic Digital Network (AUTODIN) Operating Procedures,* JANAP 128(D), April 1972.

6. Department of the Army. *Communications Center Operations 72,* C12, AR 611-201, February 1969.

7. Department of the Army. *USASTRATCOM, Pentagon Telecommunications Center: Mission, Organization, Functions.*

8. Department of the Army. *Standing Operating Procedures, 105-1-, 105-2-, 105-3-, and 105-4-,* June 1971.

9. Departments of the Army, The Navy, and The Air Force. *Operator, Organizational, DS, GS, and Depot Maintenance Manual:*

   TM 11-7440-214-15
   TM 11-7440-215-15
   TM 11-7440-217-15
   TM 11-7440-218-15
   TM 11-7440-219-15
   TM 11-7440-221-15
   TM 11-7440-222-15
   TM 11-7440-223-15
   TM 11-7440-228-15
   TM 11-7440-238-15
   TM 11-7440-239-15

10. U.S. Army Southeastern Signal School. *Workbook for Data Communications Terminal Station Operation,* January 1972.

11. U.S. Army Southeastern Signal School. *Program of Instruction for 580-72F20, Data Communications Terminal Specialist Course, MOS: 72F20,* August 1972.

12. U.S. Army Southeastern Signal School. *Program of Instruction for 580-72B20, Communications Center Specialist Course, MOS: 72B20,* March 1972.

13. U.S. Army Signal School. *Program of Instruction for 580-72G20, AUTODIN Switching Center Traffic Operations Course, MOS: 72G20,* November 1972.

14. U.S. Army Signal Center and School. *Program of Instruction for 580-72G30, AUTODIN switching Center Specialist Course, MOS: 72G30,* September 1973.

15. U.S. Army Signal Center and School. *Program of Instruction for 4C-F10/580-72G40, ADMSC Operation Supervisory Course, MOS: 72G40*, September 1973.

16. U.S. Army Signal Center and School. *AUTODIN Operations Training, ASC Operations Supervisory Responsibilities/Duties*, Information Sheet.

17. U.S. Army Signal Center and School. *AUTODIN Operations Training, Introduction to AUTODIN*, Information Sheet.

18. U.S. Army Signal School. *AUTODIN Operations Training, System Console, Start-Up, Restart, and Reload Procedures*, Operations Sheet.

19. U.S. Army Joint Support Command. *Automatic Message Processing System*, Operations Handbook.

20. Burroughs Corporation. *Automatic Message Processing System, AN/FYC-1*, Final Report DA-28-043-AMC-02238(E), June 1970.

21. Burroughs Corporation. *Qualitative and Quantitative Personnel Requirements Information for Automatic Message Processing System (Operational Phase)*, July 1967.

22. U.S. Army Strategic Communications Command, East Coast Telecommunications Center, *AUTOFAC Operations.*

23. U.S. Army Strategic Communications Command, East Coast Telecommunications Center. *Introduction to AUTODIN*, August 1972.

24. International Business Machines. *System/360 Model 20, AUTODIN Multimedia Terminal—Principles of Operation and Operating Procedures*, September 1969.

25. Sperry Univac Federal Systems. *Automated Multi Media Exchange (AMME)*, Operator's Manual, vol. 5, 9000 Operations.

Appendix B

LETTER OF TRANSMITTAL

DEPARTMENT OF THE ARMY
U. S. ARMY COMMUNICATIONS COMMAND
FORT HUACHUCA, ARIZONA 85613

ACC-POA-SI

APR 10 1974

SUBJECT: Common Core Personnel and Training Requirements Study

1. Headquarters, U.S. Army Communications Command is sponsoring research in personnel and training for automated telecommunications centers. This research, conducted by the Human Resources Research Organization (HumRRO) entails collecting data by the administration of a questionnaire. The questionnaire seeks to determine which equipment is operated and which tasks are performed by enlisted personnel in MOS 72B, 72F, and 72G. The questionnaires are being distributed to data communications switches and terminals worldwide. This questionnaire will help determine the personnel and training requirements of telecommunications centers having a variety of equipment systems.

2. Personnel of your unit have been selected to respond to the questionnaire.

3. It is requested that personnel of duty MOS 72B, 72F, and 72G in the levels and numbers indicated on the package complete the questionnaire. Substitutions should be made if the personnel requested are not available. Where it is possible, supervisors should select individuals with at least 6 months experience on the job to complete the questionnaire.

4. It is further requested that the questionnaires be completed by Tuesday, 30 April 1974 and mailed directly to Mr. R. C. Trexler, HumRRO, 300 North Washington Street, Alexandria, Virginia 22314.

1 Incl
as

JOHN E. HOOVER
Major General, USA
Deputy Commanding General

Appendix C

USACC ORGANIZATION PARTICIPATING IN STUDY

ALASKA

Commander, USACC–Alaska, Fixed Sig Ops Co, North, APO Seattle 98731
(Ft Wainwright, Alaska)
Commander, USACC–Alaska, Fixed Sig Ops Co, South, APO Seattle 98749
(Ft Richardson, Alaska)

SOUTH

Commander, USACC–South, APO New York 09827 (Ft Clayton, Canal Zone)

EUROPE

Commander, USACC–EUR, Sig Spt Co, APO New York 09696
(Nurenberg, Germany)
Commander, USACC–EUR, AUTODIN Sw Ctr, APO New York 09178
(Augsburg, Germany)
Commander, USACC–EUR, Sig Spt Co, APO New York 09052
(Zweibrucken, Germany)
Commander, USACC–EUR, Sig Spt Co, Worms, APO New York 09058
(Worms, Germany)
Commander, USACC–EUR, HHD Sig Spt Bn 4, APO New York 09227
(Kaiserslautern, Germany)
Commander, USACC–EUR, Sig Spt Agency, Med, APO New York 09019
(Leghorn, Italy)
Commander, USACC–EUR, Sig Spt Agency, Med, Coltano, APO New York 09019
(Coltano, Italy)
Commander, USACC–EUR, Sig Ops Co, APO New York 09102
(Heidelberg, Germany)
Commander, USACC–EUR, Sig Facility, Pirmasens, APO New York 09189
(Pirmasens, Germany)
Commander, USACC–EUR, Sig Spt Co, Frankfurt, APO New York 09757
(Frankfurt, Germany)
Commander, USACC–EUR Sig Spt Co, Stuttgart, APO New York 09154
(Stuttgart, Germany)
Commander, USACC–EUR, 167th Sig Co, APO New York 09221
(Vicenza, Italy)
Commander, USACC–EUR, 581st Sig Co, APO New York 09069
(Bremerhaven, Germany)

PACIFIC

Commander, USACC–Japan, Sig Spt Agency, North, APO San Francisco 96343
(Cp Zama, Japan)
Commander, USACC–Japan, Sig Spt Agency, South, APO San Francisco 96331
(Sukiran, Japan)
Commander, Co. C, USACC Long Lines Bn–South Korea, APO San Francisco 96271
(Cp Humphreys, Korea)
Commander, USACC Comm Ops Facility–Korea, APO San Francisco 96218
(Taegu, Korea)
Commander, USACC Sig Spt Agency, Hawaii, APO San Francisco 96557
(Schofield Bks, HI) (Ft Shafter, HI)
Commander, Co. A, USACC LL Bn–South Korea, APO San Francisco 96259
(Pusan, Korea)
Commander, USACC–Japan Sig Spt Agency, South, APO San Francisco 96331
(Ft Buckner)

CONUS

Commander, USACC–MTMTS Comm–E Act, Bayonne, New Jersey 07002
Commander, Opn Co, HQ Ft Ritchie, Ft Ritchie, Maryland 21719
Commander, USACC East Coast Telecommunications Center, Ft Detrick, Maryland 21701
Commander, USACC Detachment, Ft Leavenworth, Kansas 66027
Commander, USACC Pentagon Telecommunications Center, Washington, DC 20310
Commander, USACC Pentagon Telecommunications Center, Washington, DC 20310 (Forrestal Bldg)
Commander, USACC Pentagon Telecommunications Center, Washington, DC 20310 (Hoffman Bldg)
Commander, USACC Agency–Carlisle Barracks, Carlisle Barracks, Pennsylvania 17013
Commander, USACC Miami–Key West Sig FM (AD), Homestead AFB, Florida 33030
Commander, USACC Comm Agency–MTMTS, Washington, DC 20315
Commander, USACC Comm–E Act West Area, Oakland, California 94626
Commander, USACC–MTMTS Comm–E Act Sunny Point, Southport, North Carolina 28461
Commander, USACC Sig Det (AD), 1st Region, Stewart Field, New York 12250
Commander, USACC–Pittsburg Sig TM (AD), Oakdale, Pennsylvania 15071
Commander, USACC–MTMTS Comm–E Act Eastern Area, Brooklyn, New York 11250

Appendix D

CODES FOR KEYPUNCHING CALLSIGN QUESTIONNAIRE DATA

Unit code—2 Card Column

01-40: from mailout list

Sequential number assigned to individual—3 Card Column

001-

Command—1 Card Column

1—CONUS (includes Alaska and South)
2—Europe
3—Pacific

Duty MOS/Primary MOS/Secondary MOS—1 Card Column

1—72B20
2—72B30
3—72B40
4—72F20
5—72F40
6—72G20
7—72G30
8—72G40
9—Other

Grade—1 Card Column

0—E-2
1—E-3
2—E-4
3—E-5
4—E-6
5—E-7

System/Equipment—3 Card Column

101—UNIVAC 418-II and DSTE and Commercial Terminal
102—UNIVAC 418-II and Commercial Terminal
221—DSTE Terminal
222—UNIVAC DCT-9000 Terminal
224—IBM 360/20 Terminal
226—IBM 360/50 Peripherals
227—CDC 1700 Terminal
232—UNIVAC 3301 Printer
233—UNIVAC SPECTRA 70/15 Printer
241—Multiple Commercial Terminals
251—DSTE and Commercial Terminals
360—Commercial Switch and Commercial Terminal
361—Commercial Switch and DSTE Terminal

System/Equipment–3 Card Column *(Continued)*

371–Overseas AUTODIN Switch and DSTE Terminal
372–Overseas AUTODIN Switch
411–Methods and Results and Results and Analysis
412–COMSEC
413–Fort Shafter
414–Pentagon Miscellaneous

Size (traffic density)–1 Card Column

1–1 to 199 messages (daily average)
2–200 to 799 messages
3–800 to 3599 messages
4–Above 3600 messages
5–Other

Appendix E

CARD LAYOUT FOR KEYPUNCHING CALLSIGN QUESTIONNAIRE DATA

CARD #1

Card Column		
1-2	Unit	} I.D. #
3-5	Sequential number assigned to individual	
6-7	Blank	
8	Command	
9	Duty MOS	
10-12	System/Equipment	
13	Size (traffic density)	
14	Duty MOS	
15	Command	
16-17	Blank	
18	Primary MOS	
19	Secondary MOS	
20	Grade	
21-22	Months on job	
23-24	Months for proficiency	
25	Blank	
26-45	Q items 1-20	
46	Blank	
47-66	Q items 21-40	
67	Blank	
68-77	Q items 41-50	
78-79	Project code	
80	Card sequence #	

CARD # 2

Card Column		
1-2	Unit	} I.D. #
3-5	Sequential number assigned to individual	
6	Blank	
7-16	Q items 51-60	
17	Blank	
18-37	Q items 61-80	
38	Blank	
39-58	Q items 81-100	
59	Blank	
60-77	Q items 101-118	
78-79	Project code	
80	Card sequence #	

CARD #3

Card Column		
1-2	Unit	} I.D. #
3-5	Sequential number assigned to individual	
6	Blank	
7-8	Q items 119-120	
9	Blank	
10-29	Q items 121-140	
30	Blank	
31-50	Q items 141-160	
51	Blank	
52-71	Q items 161-180	
72	Blank	
73-77	Q items 181-185	
78-79	Project code	
80	Card sequence #	

CARD # 4

Card Column		
1-2	Unit	} I.D. #
3-5	Sequential number assigned to individual	
6	Blank	
7-21	Q items 186-200	
22	Blank	
23-42	Q items 201-220	
43	Blank	
44-63	Q items 221-240	
64	Blank	
65-77	Q items 241-253	
78-79	Project code	
80	Card sequence #	

CARD #5

Card Column		
1-2	Unit	} I.D. #
3-5	Sequential number assigned to individual	
6	Blank	
7-13	Q items 254-260	
14	Blank	
15-34	Q items 261-280	
35	Blank	
36-55	Q items 281-300	
56	Blank	
57-76	Q items 301-320	
77	Blank	
78-79	Project code	
80	Card sequence #	

CARD #6

Card Column		
1-2	Unit	} I.D. #
3-5	Sequential number assigned to individual	
6	Blank	
7-26	Q items 321-340	
27	Blank	
28-47	Q items 341-360	
48	Blank	
49-68	Q items 361-380	
69	Blank	
70-77	Q items 381-388	
78-79	Project code	
80	Card sequence #	

CARD #7

Card Column		
1-2	Unit	I.D. #
3-5	Sequential number assigned to individual	I.D. #
6	Blank	
7-18	Q items 389-400	
19	Blank	
20-22	Q items 401-403	
23	Blank	
24	Central Processing Unit	Terminal Equipment
25	Common Control Unit	Terminal Equipment
26	Card Reader	Terminal Equipment
27	Card Punch	Terminal Equipment
28	Paper Tape Reader	Terminal Equipment
29	Paper Tape Punch	Terminal Equipment
30	Printer	Terminal Equipment
31	Keyboard	Terminal Equipment
32	Mag Tape Unit	Terminal Equipment
33	Device Switch Module	Terminal Equipment
34	Data Adapter Unit	Terminal Equipment
35	Blank	
36	Processor	Switch Equipment
37	System Console	Switch Equipment
38	Card Reader	Switch Equipment
39	Card Punch	Switch Equipment
40	Paper Tape Reader	Switch Equipment
41	Paper Tape Punch	Switch Equipment
42	Monitor Printer	Switch Equipment
43	High Speed Printer	Switch Equipment
44	Mag Tape Unit	Switch Equipment
45	Teletypewriter	Switch Equipment
46	Maintenance Console	Switch Equipment
47	Blank	
48	Optical Character Reader	Optical Character Equipment
49	Teletypewriter	Optical Character Equipment
50	Video Display Console	Optical Character Equipment
51	Printer	Optical Character Equipment
52	Paper Tape Punch	Optical Character Equipment
53	Blank	
54	Keypunch	Miscellaneous Equipment
55	COMSEC	Miscellaneous Equipment
56	Copier	Miscellaneous Equipment
57	Offset Press	Miscellaneous Equipment
58	Visual Display Console	Miscellaneous Equipment
59	Teletypewriter	Miscellaneous Equipment
60	Interpreter	Miscellaneous Equipment
61	Card Counter	Miscellaneous Equipment
62	Typewriter	Miscellaneous Equipment
63	Telecopier	Miscellaneous Equipment

Appendix F

QUESTIONNAIRE ITEM FREQUENCY RESPONSE DISTRIBUTION

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
1	0	13	0	13	100	74
2	2	32	0	12	98	56
3	0	20	2	8	98	72
4	2	20	0	4	98	76
5	5.5	12	3.5	16	91	72
6	9	12.5	22	37.5	69	50
7	2	8	3.5	12	94.5	80
8	2	4	5.5	33.5	92.5	62.5
9	3.5	8.5	5.5	16.5	91	7.5
10	3.5	24	3.5	16	93	60
11	12.5	21	25.5	33.5	62	45.5
12	11	12	26	20	63	68
13	13.5	12.5	29	25	57.5	62.5
14	27.5	18	2	9	70.5	73
15	14.5	32	12.5	18	73	50
16	3.5	12.5	5.5	25	91	62.5
17	3.5	4	22	25	74.5	71
18	7.5	8	27	28	65.5	64
19	5.5	20	33	28	61.5	52
20	3.5	4	22	24	74.5	72
21	3.5	16.5	25.5	25	71	58.5
22	7.5	8	27.5	36	65	56
23	9.5	21	37	29	53.5	50
24	11.5	20	30	16	58.5	64
25	22	15.5	7.5	11.5	70.5	73

(Continued)

[a]Key: 0–Not performed
1–More than 1 or 2 times a year but *less* than once a month
2–More than 1 or 2 times a month but *less* than once a week
3–More than 1 or 2 times a week but *less* than once a day
4–More than 1 or 2 times a day but *less* than once an hour
5–More than once an hour

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
26	15	19	5.5	11.5	79.5	69.5
27	27	23	7.5	7.5	65.5	69.5
28	6	27	8	11.5	86	61.5
29	11.5	28	4	12	84.5	60
30	22.5	29	9.5	21	68	50
31	53.5	50	18.5	41.5	28	8.5
32	7.5	19	18.5	11.5	74	69.5
33	9.5	4	5.5	4	85	92
34	5.5	20	11.5	8	83	72
35	0	19	7.5	15.5	92.5	65.5
36	5.5	11.5	37	38.5	57.5	50
37	41	56.5	23.5	17.5	35.5	26
38	16.5	28	26	28	57.5	44
39	9.5	16	13	16	77.5	68
40	6	19	11.5	7.5	82.5	73.5
41	4	11.5	4	4	92	84.5
42	2	19	22.5	11.5	75.5	69.5
43	11.5	19	28.5	23	60	58
44	42	41.5	17.5	21	40.5	37.5
45	60.5	48	14	36	25.5	16
46	46	48	21	20	33	32
47	44	54	6	11.5	50	34.5
48	92	88	2	12	6	0
49	2	12	2	8	96	80
50	29	33.5	11.5	4	59.5	62.5
51	17	25	0	8.5	83	66.5
52	52	65	22	26	26	9
53	35.5	56.5	8	13	56.5	30.5
54	15.5	16	14	12	70.5	72
55	71.5	87.5	13	12.5	15.5	0
56	30	33.5	9.5	8.5	60.5	58
57	50	58.5	8	17	42	24.5
58	63	62.5	14	12.5	23	25
59	94	83.5	2	4	4	12.5
60	57.5	52	7.5	17.5	35	30.5

(Continued)

[a]Key:
- 0–Not performed
- 1–More than 1 or 2 times a year but *less* than once a month
- 2–More than 1 or 2 times a month but *less* than once a week
- 3–More than 1 or 2 times a week but *less* than once a day
- 4–More than 1 or 2 times a day but *less* than once an hour
- 5–More than once an hour

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
61	52	54	4	4	44	42
62	22.5	24	2	16	75.5	60
63	32.5	33.5	4	4	63.5	62.5
64	36.5	56.5	6	4.5	57.5	39
65	41	41.5	9.5	21	49.5	37.5
66	53	43.5	11.5	22	35.5	34.5
67	11	24	11	24	78	52
68	11.5	29	7.5	25	81	46
69	59	72	19.5	16	21.5	12
70	91.5	100	6.5	0	2	0
71	98	96	2	4	0	0
72	15	12.5	0	8.5	85	79
73	0	8	0	8	100	84
74	4	8	4	12	92	80
75	72.5	41.5	4	8.5	23.5	50
76	64.5	66.5	4	8.5	31.5	25
77	57.5	54	6	21	36.5	25
78	63	62.5	6	12.5	31	25
79	45.5	50	4	12.5	50.5	37.5
80	23	37.5	2	8.5	75	54
81	7.5	4	2	8	90.5	88
82	49	58.5	12.5	12.5	38.5	29
83	7.5	16.5	17.5	25	75	58.5
84	25	32	25	32	50	36
85	29	30.5	25	35	46	34.5
86	31	37.5	23	25	46	37.5
87	34.5	58.5	23	25	42.5	16.5
88	26	50	24	16.5	50	33.5
89	37	58.5	31.5	16.5	31.5	25
90	2	8	16.5	16	81.5	76
91	11	29	16.5	21	72.5	50
92	15	12.5	20	21	65	66.5
93	3.5	8.5	28	33.5	68.5	58
94	11.5	25	26.5	25	62	50
95	17	25	34	25	49	50

(Continued)

[a]Key: 0—Not performed
1—More than 1 or 2 times a year but *less* than once a month
2—More than 1 or 2 times a month but *less* than once a week
3—More than 1 or 2 times a week but *less* than once a day
4—More than 1 or 2 times a day but *less* than once an hour
5—More than once an hour

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
96	34	62.5	21	8.5	45	29
97	44	29	31.5	41.5	24.5	29.5
98	58.5	62.5	22.5	16.5	19	21
99	64	66.5	21	12.5	15	21
100	13	20	5.5	16	81.5	64
101	21	21	19	25	60	54
102	28	21	11	29	61	50
103	3.5	29	18.5	21	78	50
104	5.5	30.5	22	26	72.5	43.5
105	9.5	16	22	24	68.5	60
106	29.5	32	15	20	55.5	48
107	54.5	40	9.5	32	36	28
108	71.5	33.5	13	21	15.5	45.5
109	94.5	48	2	12	3.5	40
110	94.5	48	2	12	3.5	40
111	91	33.5	2	16.5	7	50
112	85	46	4	16.5	11	37.5
113	92.5	20	3.5	12	4	68
114	89	41.5	3.5	12.5	7.5	46
115	78	78.5	3.5	8.5	18.5	13
116	79.5	26	3.5	26	17	48
117	85	28	5.5	24	9.5	48
118	85	29	7.5	25	7.5	46
119	96	75	2	8.5	2	16.5
120	94.5	24	2	24	3.5	52
121	96	61	2	13	2	26
122	94.5	48	2	20	3.5	32
123	96	71	2	16.5	2	12.5
124	98	92	2	4	0	4
125	98	91.5	2	8.5	0	0
126	98	91.5	2	0	0	8.5
127	100	95.5	0	4.5	0	0
128	100	95.5	0	4.5	0	0
129	100	56.5	0	22	0	21.5
130	43	37.5	15.5	12.5	41.5	50

(Continued)

[a]Key: 0—Not performed
1—More than 1 or 2 times a year but *less* than once a month
2—More than 1 or 2 times a month but *less* than once a week
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4—More than 1 or 2 times a day but *less* than once an hour
5—More than once an hour

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
131	34	48	2	17.5	64	34.5
132	96	77.5	2	18.5	2	4
133	96	78.5	2	17.5	2	4
134	54	41.5	0	21	46	37.5
135	50	50	2	16.5	48	33.5
136	96	58.5	2	8.5	2	33
137	43	35	6	13	51	52
138	44	39	8	8.5	48	52.5
139	34	52	4	17.5	62	30.5
140	12	21.5	29.5	22	58.5	56.5
141	19.5	25	23.5	16.5	57	58.5
142	45	41.5	13.5	16.5	41.5	42.5
143	100	100	0	0	0	0
144	73.5	76	8	16	18.5	8
145	81.5	66.5	4	25	14.5	8.5
146	85.5	91.5	12.5	8.5	2	0
147	92	91.5	4	8.5	4	0
148	83.5	92	4	4	12.5	4
149	81.5	58.5	8	25	10.5	16.5
150	100	71	0	8.5	0	20.5
151	100	83.5	0	0	0	16.5
152	100	83.5	0	0	0	16.5
153	92	79	4	4	4	17
154	98	79	0	8.5	2	12.5
155	98	41.5	0	25	2	33.5
156	94	52	0	13	6	35
157	76	25	4.5	33.5	19.5	41.5
158	50	29	23	12.5	27	58.5
159	83	83.5	7.5	4	9.5	12.5
160	45.5	29	7.5	4	47	67
161	56.5	20	9.5	8	34	72
162	88.5	32	4	4	7.5	64
163	92.5	21	2	16.5	5.5	62.5
164	81	33.5	0	16.5	19	50
165	92.5	50	4	4	3.5	46

(Continued)

[a]Key:
0–Not performed
1–More than 1 or 2 times a year but *less* than once a month
2–More than 1 or 2 times a month but *less* than once a week
3–More than 1 or 2 times a week but *less* than once a day
4–More than 1 or 2 times a day but *less* than once an hour
5–More than once an hour

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
166	45.5	41.5	9.5	4	45	54.5
167	88.5	37.5	0	21	11.5	41.5
168	92.5	28	3.5	20	4	52
169	75	24	2	24	23	52
170	96	83.5	2	12.5	2	4
171	87	50	7.5	21	5.5	29
172	96	87.5	2	8.5	2	4
173	100	96	0	4	0	0
174	94.5	87.5	3.5	8.5	2	4
175	56.5	40	9.5	16	34	44
176	64	58.5	4	16.5	32	25
177	81	56	7.5	16	11.5	28
178	88	36	4	16	8	48
179	21	16	11.5	20	67.5	64
180	23	16.5	2	25	75	58.5
181	96	40	2	12	2	48
182	13	21	5.5	21	81.5	58
183	15	41.5	2	8.5	83	50
184	90.5	48	2	4	7.5	48
185	13	16.5	4	8.5	83	75
186	6	12	4	8	90	80
187	29	29	11.5	0	59.5	71
188	17.5	16	9.5	0	73	84
189	13.5	20	11.5	4	75	76
190	65.5	48	7.5	4	27	48
191	13	16	4	4	83	80
192	54.5	50	9.5	4	36	46
193	57	52	12	12	31	36
194	94	58.5	2	12.5	4	29
195	96	92	2	4	2	4
196	4	36	6	28	90	36
197	2	32	4	8	94	60
198	4	24	6	8	90	68
199	4	29	6	25	90	46
200	64.5	82.5	2	4.5	33.5	13

(Continued)

[a]Key:
0—Not performed
1—More than 1 or 2 times a year but *less* than once a month
2—More than 1 or 2 times a month but *less* than once a week
3—More than 1 or 2 times a week but *less* than once a day
4—More than 1 or 2 times a day but *less* than once an hour
5—More than once an hour

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
201	16	20	4	8	80	72
202	15.5	50	15.5	16.5	69	33.5
203	75.5	62.5	7.5	21	17	16.5
204	98	92	0	4	2	4
205	96	87.5	0	8.5	4	4
206	8	12	12	48	80	40
207	74	54	2	12.5	24	33.5
208	11.5	17.5	4	8.5	84.5	74
209	51	32	4	8	45	60
210	88.5	64	4	0	7.5	36
211	88	68	4	0	8	32
212	98	96	0	0	2	4
213	98	80	0	8	2	12
214	98	84	0	4	2	12
215	98	96	0	0	2	4
216	98	88	0	4	2	8
217	98	88	0	4	2	8
218	98	87.5	0	8.5	2	4
219	98	79	0	4	2	17
220	96	91.5	2	8.5	2	0
221	82.5	74	6	4.5	11.5	21.5
222	82.5	79	4	8.5	13.5	12.5
223	92.5	87.5	2	8.5	5.5	4
224	96	96	2	4	2	0
225	90.5	92	7.5	4	2	4
226	96	96	2	4	2	0
227	85	83	7.5	8.5	7.5	8.5
228	90.5	83	4	8.5	5.5	8.5
229	98	91.5	0	8.5	2	0
230	92.5	79	0	16.5	7.5	4.5
231	90.5	79	4	16.5	5.5	4.5
232	96	96	2	4	2	0
233	98	100	2	0	0	0
234	100	100	0	0	0	0
235	98	100	2	0	0	0

(Continued)

[a]Key:
0–Not performed
1–More than 1 or 2 times a year but *less* than once a month
2–More than 1 or 2 times a month but *less* than once a week
3–More than 1 or 2 times a week but *less* than once a day
4–More than 1 or 2 times a day but *less* than once an hour
5–More than once an hour

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
236	98	100	2	0	0	0
237	92	96	4	0	4	4
238	98	100	0	0	2	0
239	90	83.5	2	4	8	12.5
240	96	87.5	2	4	2	8.5
241	94	83	4	8.5	2	8.5
242	100	83	0	8.5	0	8.5
243	94	87.5	4	8.5	2	4
244	88	75	2	12.5	10	12.5
245	90	83.5	6	4	4	12.5
246	100	96	0	4	0	0
247	100	87.5	0	8.5	0	4
248	100	91.5	0	8.5	0	0
249	98	91.5	0	0	2	8.5
250	96	91.5	0	0	4	8.5
251	98	92	0	4	2	4
252	98	96	0	0	2	4
253	96	96	0	0	4	4
254	100	96	0	4	0	0
255	98	96	2	4	0	0
256	100	96	0	4	0	0
257	100	96	0	4	0	0
258	100	100	0	0	0	0
259	98	100	0	0	2	0
260	100	96	0	0	0	4
261	98	91.5	2	8.5	0	0
262	98	87.5	0	12.5	2	0
263	98	87.5	0	12.5	2	0
264	100	96	0	4	0	0
265	100	83.5	0	12.5	0	4
266	92	96	4	0	4	4
267	98	96	2	4	0	0
268	98	96	2	4	0	0
269	100	96	0	4	0	0
270	100	96	0	4	0	0

(Continued)

[a]Key: 0–Not performed
1–More than 1 or 2 times a year but *less* than once a month
2–More than 1 or 2 times a month but *less* than once a week
3–More than 1 or 2 times a week but *less* than once a day
4–More than 1 or 2 times a day but *less* than once an hour
5–More than once an hour

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
271	100	91.5	0	8.5	0	0
272	100	74	0	13	0	13
273	100	95.5	0	4.5	0	0
274	100	87.5	0	0	0	12.5
275	100	41.5	0	16.5	0	42
276	100	33.5	0	25	0	41.5
277	100	61	0	4.5	0	34.5
278	100	61	0	13	0	26
279	100	82.5	0	4.5	0	13
280	100	74	0	17.5	0	8.5
281	100	52	0	13	0	35
282	100	78.5	0	8.5	0	13
283	100	95.5	0	0	0	4.5
284	100	74	0	4.5	0	21.5
285	92	87	4	0	4	12
286	100	87	0	8.5	0	4.5
287	17.5	27.5	0	9	82.5	63.5
288	21.5	32	0	9	78.5	59
289	10	32	2	9	88	59
290	47	63.5	6	13.5	47	23
291	27.5	36.5	13.5	13.5	59	50
292	59	63.5	6	13.5	35	23
293	82	63.5	8	18	10	18.5
294	98	91	2	9	0	0
295	88	100	2	0	10	0
296	39	50	10	13.5	51	36.5
297	66.5	68	8	18	25.5	14
298	68	68	14	23	18	19
299	82	73	6	18	12	9
300	96	82	2	9	2	9
301	75.5	86.5	16.5	4.5	8	9
302	60	57	30	28.5	10	14.5
303	84	83	8	8.5	8	8.5
304	32.5	48	54	35	13.5	17
305	63.5	72.5	34.5	27.5	2	0

(Continued)

[a]Key: 0–Not performed
1–More than 1 or 2 times a year but *less* than once a month
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5–More than once an hour

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
306	55	52	41	39	4	9
307	56	43.5	34.5	48	9.5	8.5
308	32.5	43.5	9.5	22	58	34.5
309	19	45.5	13.5	22.5	67.5	32
310	6	13	9.5	30.5	84.5	56.5
311	19	37.5	34.5	41.5	46.5	21
312	36.5	91.5	2	8.5	61.5	0
313	54	74	15.5	21.5	30.5	4.5
314	6	21	56	29	38	50
315	61.5	78.5	11.5	21.5	27	0
316	92	74	0	21.5	8	4.5
317	54	26	21	30.5	25	43.5
318	73	48	13.5	17.5	13.5	34.5
319	98	100	0	0	2	0
320	68	62.5	22.5	21	9.5	16.5
321	92	87.5	4	4	4	8.5
322	98	96	0	4	2	0
323	98	100	0	0	2	0
324	88.5	96	7.5	0	4	4
325	92.5	75	5.5	16.5	2	8.5
326	94.5	78.5	3.5	13	2	8.5
327	85	62.5	7.5	21	7.5	16.5
328	100	100	0	0	0	0
329	98	96	2	4	0	0
330	100	100	0	0	0	0
331	100	100	0	0	0	0
332	98	100	2	0	0	0
333	68	78.5	7.5	0	24.5	21.5
334	77.5	74	4	4.5	18.5	21.5
335	83	69.5	9.5	13	7.5	17.5
336	81	82.5	13	13	6	4.5
337	23.5	30.5	2	8.5	74.5	61
338	19	9	6	18	75	73
339	17.5	4.5	4	17.5	78.5	78
340	13.5	12.5	4	4	82.5	83.5

(Continued)

[a]Key: 0–Not performed

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Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
341	26.5	17.5	13	17.5	60.5	65
342	11.5	0	7.5	4.5	81	95.5
343	53	52	4	8.5	43	39.5
344	92	62.5	2	8.5	6	29
345	81	74	4	8.5	15	17.5
346	70	54	2	4	28	42
347	87	65	5.5	8.5	7.5	26.5
348	85	82.5	9.5	4.5	5.5	13
349	94.5	87	2	4.5	3.5	8.5
350	96	87	2	8.5	2	4.5
351	98	91	0	9	2	0
352	100	95.5	0	0	0	4.5
353	90.5	86.5	0	9	9.5	4.5
354	98	100	0	0	2	0
355	100	100	0	0	0	0
356	96	100	0	0	4	0
357	100	100	0	0	0	0
358	77	82	4	9	19	9
359	98	100	2	0	0	0
360	98	95	2	5	0	0
361	70.5	82	4	4.5	25.5	13.5
362	82.5	91	0	0	17.5	9
363	56	59	4	13.5	40	27.5
364	75	91	0	0	25	9
365	77	86.5	0	4.5	23	9
366	61	82	6	4.5	33	13.5
367	84.5	82.5	2	8.5	13.5	9
368	74.5	82.5	8	4.5	17.5	13
369	61	78.5	8	13	31	8.5
370	80.5	87	2	4.5	17.5	8.5
371	82.5	91	2	4.5	15.5	4.5
372	94	91	4	4.5	2	4.5
373	62.5	65	8	8.5	29.5	26.5
374	47	61	12	17.5	41	21.5
375	80.5	82.5	0	8.5	19.5	9

(Continued)

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4—More than 1 or 2 times a day but *less* than once an hour
5—More than once an hour

Job Element Statement	Frequency of Performance[a]					
	0		1, 2		3, 4, 5	
	DSTE	Commercial	DSTE	Commercial	DSTE	Commercial
376	41	74	10	8.5	49	17.5
377	78	87	2	4.5	20	8.5
378	74.5	82.5	4	13	21.5	4.5
379	66.5	61	13.5	26	20	13
380	70.5	78	10	17.5	19.5	4.5
381	90	91	2	4.5	8	4.5
382	78.5	82.5	4	4.5	17.5	13
383	86	95.5	10	4.5	4	0
384	58	66.5	18	29.5	24	4
385	94	96	2	0	4	4
386	71	75	13.5	21	15.5	4
387	65.5	83.5	13.5	12.5	21	4
388	47	41.5	10	16.5	43	42
389	74.5	83.5	4	8.5	21.5	8
390	19	16.5	0	16.5	81	67
391	19	20	0	12	81	68
392	35.5	40	0	16	65.5	44
393	44	46	9.5	12.5	46.5	41.5
394	69	75	6	8.5	25	16.5
395	82.5	91.4	10	4.5	7.5	4.5
396	36	37.5	28	29.5	36	33
397	77	77.5	7.5	13.5	15.5	9
398	49	58.5	6	4	45	37.5
399	86.5	83.5	6	4	7.5	12.5
400	92	91.5	4	8.5	4	0
401	96	87.5	2	8.5	2	4
402	86.5	96	7.5	4	6	0
403	80.5	83	6	8.5	13.5	8.5

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Appendix G

COMMON CORE JOB ELEMENTS

Common Core Elements at ⩾ 60% Level (N = 58)

Job Element Statement

1. Process incoming narrative traffic.
3. Assign communication center number to incoming message.
4. Check that incoming message is complete and free from garbles.
5. Affix appropriate security cover sheet to incoming message.
7. Process outgoing messages following JANAP 128.
8. Review messages for appropriate format, routing, and precedence.
9. Screen messages and forms for obvious errors and initiate corrections.
10. Review local traffic for text correctness.
12. Process messages requiring a report of time of receipt.
14. Process messages over common user circuits.
16. Check multiple processing of messages to insure protection of all addresses.
17. Report operating deficiencies to supervisory personnel.
18. Check previous traffic to verify a suspected duplicate.
20. Process misrouted messages.
25. Maintain received card message header file.
26. Maintain transmitted card message header file.
27. Maintain transmitted card message deck file.
28. Maintain originating narrative message file.
29. Maintain incoming narrative message file.
32. Divide messages into pages and sections.
33. Route messages using ACP 117, U.S. SUPP-2.
34. Determine routing from ACP 117 using information on DD Form 1392, Data Message Form.
35. Determine routing from ACP 117 using information on DD Form 173, Message Form.
39. Prepare messages in format required for transmission by way of automatic digital networks.
40. Prepare message header format for data pattern messages.
41. Check message header and trailer cards for correctness.
42. Recognize and correct message format error causing a reject by the AUTODIN switch.
49. Scan messages for delivery responsibility and legibility.
51. Log incoming and outgoing messages on DA Form 11-39, Communication Center Delivery List.
54. Fill in DA Form 11-118, Message Number Sheet.
62. Log messages on DA Form 4011, Delivery Register.
63. Log incoming message on DA Form 4012, Terminating Message Number Sheet.
72. Account for incoming and outgoing messages.
73. Maintain log of incoming messages.
74. Maintain log of outgoing messages.

Job Element Statement

81. Place incoming message in appropriate user agency box for pick-up.
90. Take required action on service messages.
92. Interpret manually generated service messages and take required action.
100. Maintain file of service messages.
105. Correct errors in tapes and punched cards by means of local corrections.

179. Determine cause of machine stops and malfunctions.
185. Load blank cards in card punch.
186. Receive incoming card-message decks from card punch machine.
188. Determine card count.
189. Prepare header and trailer cards for messages received for transmission.

191. Load punched cards into card reader.
197. Remove paper tape messages from machine.
198. Prepare messages into paper tape form for transmission.
201. Feed punched paper tape into paper tape reader.
208. Attend and operate data communications terminal equipment.

337. Maintain transmission security in accordance with Army regulations and local directives.
338. Maintain physical security in accordance with Army regulations and local directives.
339. Assure observance of proper security measures.
340. Handle and store classified material.
341. Dispose of classified material.

342. Insure correct processing of message traffic with regard to security classification.
390. Maintain files of outgoing messages.
391. Maintain files of incoming messages.

Common Core Elements at ≥ 40% Level (N = 58 and 51 = 109)

Job Element Statement

All of the preceding items plus:

2. Stamp incoming messages with precedence and classification.
6. Process incoming messages containing special handling instructions.
11. Inform person of prime responsibility of repeated errors in messages.
13. Process messages requiring a report of time of delivery.
15. Take appropriate action on procedural messages pertaining to message operation.

19. Forward message as a suspected duplicate.
21. Process missent messages.
22. Process readdressals.
23. Process request for message resubmission.
24. Process request for message retransmission.

30. Perform time conversion.
36. Process message rejected by the AUTODIN switch for invalid routing indicator.
38. Prepare message pilots.
43. Service incorrectly formatted messages received from local subscribers.
50. Prepare messages into page copy and make local delivery.

Job Element Statement

56. Complete DA Form 11-189, Communication Center Originating Message Register.
61. Log messages on DA Form 4010, Message Distribution Register.
67. Review DD Form 1392, Data Message Form, for proper entries.
68. Review DD Form 173, Joint Message Form, for proper entries.
80. Review local traffic for proper distribution based on subject matter and classification of message.

83. Prepare service messages using ACP 131.
91. Interpret automatically generated service messages and take required action.
93. Handle service requests for message retransmission, tracer, duplicate transmissions, etc.
94. Locate in files originating messages serviced by distant stations.
95. Respond to service messages containing lost or delayed message claims.

101. Identify transmission discrepancies and determine causes.
102. Analyze message discrepancies.
103. Correct errors in tapes and punched cards by means of reruns.
104. Correct errors in tapes and punched cards by means of service actions.
106. Prepare computer or common control unit for operation.

130. Perform procedures to establish crypto synchronization of data communications terminal with automatic switching center.
138. Coordinate control of all on-line terminal equipment.
140. Cancel outgoing message manually.
141. Retrieve and reprotect cancelled messages.
142. Identify and protect system aborted messages.

160. Interpret and take action on displays, alarms, indicators, and on-line program printouts.
166. Respond to alarms caused by program detected problems in received messages.
180. Prepare card and paper tape equipment for operation.
182. Set card reader or paper tape reader controls for transmitting a message.
183. Set card punch or paper tape punch controls for receiving a message.

187. Prepare messages into punched card form for transmission.
199. Prepare paper tape header for transmission.
206. Load paper in paper supply compartment of page printer.
209. Clear error conditions on peripheral equipment.
288. Operate teletype as tape reader.

289. Operate teletype as tape reperforator.
291. Operate teletype as page printer.
310. Clean cabinets, tape, card and paper bins.
388. Maintain communication center files.
392. Maintain card files (message cards and program cards).
393. Refer to the administrative file to identify a message reference.